

REMARKS

Reconsideration of the above-identified application in view of the foregoing amendments and following remarks is respectfully requested.

A. Claim Status / Explanation of Amendments

Claims 1-10 are pending and were rejected in the Office Action. Specifically, the rejection of claims 1-4, and 9-10 pursuant to 35 U.S.C. § 103(a) as allegedly being unpatentable over Applicant's Admitted Prior Art ("AAPA") in view of U.S. Patent No. 5,355,164 to Shimoyama, et al. ("Shimoyama") and further in view of Japanese Patent Application No. JP 04-37166 A to Tetsuji ("Tetsuji") was maintained. [11/17/08 Office Action, p. 5, ¶ 5]. Similarly, the following rejections were maintained in the Office Action: Claim 5 was rejected pursuant to 35 U.S.C. § 103(a) as allegedly being unpatentable over AAPA and Shimoyama in view of Tetsuji and further in view of U.S. Patent No. 6,353,223 to Ookawa ("Ookawa"). [11/17/08 Office Action, p. 11, ¶ 6]. Claims 6 and 8 were rejected pursuant to 35 U.S.C. § 103(a) as allegedly being unpatentable over AAPA and Shimoyama in view of Tetsuji and further in view of U.S. Patent No. 6,304,292 to Ide, et al. ("Ide"). [11/17/08 Office Action, p. 12, ¶ 7]. Claim 7 was rejected pursuant to 35 U.S.C. § 103(a) as allegedly being unpatentable over AAPA and Shimoyama in view of Tetsuji and further in view of U.S. Patent No. 6,700,609 to Abe ("Abe"). [11/17/08 Office Action, p. 13, ¶ 8].

By this paper, claim 1 is amended to recite, *inter alia*, a first correction unit which corrects signals of the effective pixel area by "subtracting the first reference signal from each horizontal line signal of the effective pixel area" and a second correction unit which corrects signals corrected by the first correction unit by "evenly subtracting a representative value, which is based on the second reference signal, from the signals of the plurality of horizontal lines of the

effective pixel area.” Support for the amendment to claim 1 may be found throughout the application as originally filed including, for example, p. 16, lns. 2-18 and Fig. 1.

No new matter will be introduced into this application by entry of these amendments. Entry is respectfully requested. After entry of these amendments claims 1-10 are currently pending.

B. Claims 1-4 and 9-10 are Patentable over AAPA in view of Shimoyama and further in view of Tetsuji

Applicant respectfully traverses the rejection of claims 1-4 and 9-10 pursuant to 35 U.S.C. § 103(a) as allegedly being obvious over AAPA in view of Shimoyama and further in view of Tetsuji. As set forth in detail below, AAPA, Shimoyama, and Tetsuji do not teach, disclose, or suggest a first correction unit which corrects signals of the effective pixel area on a row-by-row basis along with a second correction unit which corrects signals that have been corrected by the first correction unit by evenly subtracting a representative value obtained from a second reference signal. In view of the following remarks, we urge the Examiner to kindly reconsider and withdraw this rejection.

In reply to Applicant’s amendments and response of July 30, 2008, the Office Action contends that “[t]he fact the in the equation shown in Tetsuji, the signal V_2 appear to be added as argued by the Applicant, does not necessarily means that the signal is not subtracted.” [11/17/08 Office Action, p. 4, ¶ 3]. Applicant respectfully disagrees. However, notwithstanding whether Tetsuji discloses a first correction unit “adapted to correct signals of the effective pixel area by subtracting the first reference signal with respect to each corresponding horizontal line,” Applicant respectfully submits that AAPA, Shimoyama, and Tetsuji fail to teach or disclose a second correction unit which corrects signals of the effective pixel area which have been

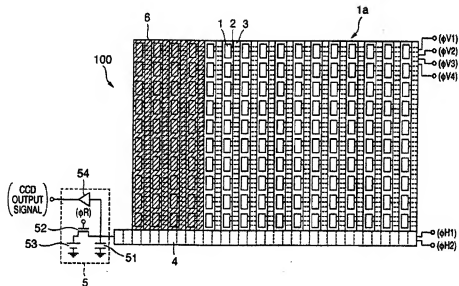
corrected by the first correction unit by “evenly subtracting a representative value, which is based on the second reference signal, from the signals of the plurality of horizontal lines of the effective pixel area” as recited in Applicant’s amended claim 1.

In rejecting claim 1, the Office Action contends that AAPA discloses “an image sensing apparatus comprising: a [second] correction unit adapted to correct signals of the effective pixel area while evenly subtracting a representative value based on the second reference signal (page 1, line 13 – page 5, line 17).” [11/17/08 Office Action, p. 6, ¶ 5]. For the convenience of the Examiner, the prior art image sensing apparatus in Fig. 7 is reproduced below. In rejecting claim 1, the Office Action equates Applicant’s “second reference signal” with the optical black (OB) region (6) in Fig. 7. Applicant explains in p. 3, Ins. 18-25 that:

In the horizontal OB region 6, the entire element surface including the photodiodes 1 is shielded from light. A signal detected by the charge detection portion 5 contains a signal photoelectrically converted by the photodiode 1 in the effective pixel region 1a, and a dark current component generated in the photodiode 1 and vertical transfer portion 3 in the horizontal OB region 6. [Applicant, p. 3, Ins. 18-25].

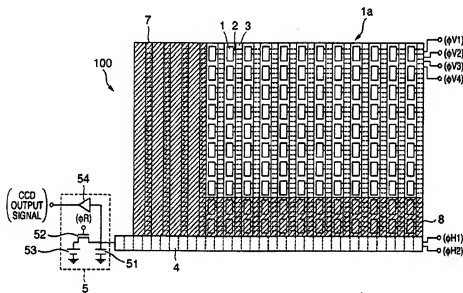
Thus, in the image sensing apparatus disclosed by AAPA, OB region (6) comprises photodiodes which are shielded from light. AAPA further discloses that in order to correct the dark current produced by the image sensing element (100), “OB clamping is executed for each row.” [Applicant, p. 5, Ins. 14-15]. That is, in Fig. 7, correction using OB region (6) is performed with respect to each corresponding horizontal line.

Applicant’s claimed second correction unit does not, however, perform clamping for each row of photodiodes. Rather, the second correction unit evenly corrects signals from the effective pixel area which have been initially corrected by a first correction unit by subtracting a



[AAPA, Fig. 7].

representative value (which is obtained from a second reference signal) from the signals of the plurality of horizontal lines of the effective pixel area. As explained with reference to Applicant's Fig. 1 (reproduced below), the "DC component of an image signal from the effective pixel region 1a is recovered for each row on the basis of the horizontal reference signal from the horizontal reference region 7." [Applicant, p. 14, ln. 27 to p. 15, ln. 3]. In Fig. 1, region (7) corresponds to the claimed "first reference pixel area which is shielded from light and does not

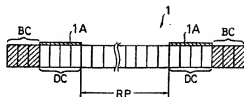


[Applicant, Fig. 1].

have a photoelectric conversion element.” Thus, a first correction unit corrects signals from region 1a by subtracting a signal from first reference region (7) (which is shielded and does not have a photodiode) for each row. This corrected signal is then uniformly corrected by a second correction unit which subtracts a representative value obtained from a second reference region (8) which comprises pixels with photodiodes that are shielded from light. By performing correction in this manner, potential errors arising from an increase in the dark current due to insufficient shielding (due, e.g., to a scratch) of region (8) can be avoided.

As explained above with reference to Figs. 1 and 7, the reference regions comprising photodiodes which are shielded from light as utilized by AAPA (region (6) in Fig. 7) and Applicant (region (8) in Fig. 1) are used to correct the image signal in different ways. AAPA uses region (6) to correct the signal on a row-by-row basis whereas Applicant uses region (8) to uniformly correct a signal which has previously been corrected using region (7). Consequently AAPA does not teach or disclose a “second correction unit adapted to correct signals of the effective pixel area, which are corrected by said first correction unit, by evenly subtracting a representative value, which is based on the second reference signal, from the signals of the plurality of horizontal lines of the effective pixel area” as recited in Applicant’s amended claim 1. As explained in detail below, this deficiency cannot be remedied by the introduction of Shimoyama or Tetsuji since neither of the supplementary references disclose the second correction unit as claimed.

Shimoyama discloses a method of correcting image read signals in a linear sensor. As explained in Applicant’s February 1, 2008 response (1st paragraph on p. 7), Shimoyama teaches that signals of a single line are corrected using a dark current value obtained from pixels without a sensor function (pixels BC in Fig. 3 which is reproduced below) by averaging a plurality of



[Shimoyama, Fig. 3].

lines. Shimoyama appears to disclose “an area of dummy pixels DC with a light blocking mask 1A of several pixels,” but does not appear to disclose using these dummy pixels to uniformly correct signals which have been corrected by a first correction unit.

As indicated in Applicant’s July 30, 2008 response, Tetsuji shows in Fig. 1 that optical signals are obtained by calculating output signals of an effective pixel area I, an optical black area II whose overall area is shielded from light, an optical black area III which has no light receiving portions with the overall area being shielded from light, and an optical black area IV which has no light receiving portions with the overall area having an area for the light receiving part opened to let the light hit said area. The Office Action explains that since Tetsuji’s “sensor would read the image signals in a row-by-row basis, the signal recovery of the image is inherently performed by subtracting the reference signals with respect to each corresponding horizontal line.” [11/17/08 Office Action, p. 9, ¶ 5]. Since, as recognized by the Office Action, each of the aforementioned reference signals is subtracted on a line-by-line basis, Applicant respectfully submits that Tetsuji also does not teach or disclose a second correction unit adapted to evenly correct signals which have been corrected by a first reference unit.

Applicant has also clarified the operation of the first correction unit by amending claim 1 such that it now recites, *inter alia*, that the first correction unit corrects signals of the effective pixel area by “subtracting the first reference signal from each horizontal line signal of the effective pixel area with respect to each corresponding horizontal line.” This amendment clarifies that the first reference signal, which is obtained from pixels that do not have a

photoelectric conversion element and are shielded from light, is subtracted from each horizontal line signal of the effective pixel area.

Accordingly, AAPA, Shimoyama, and Tetsuji – whether alone or in combination – fail to teach, disclose, or suggest a “first correction unit adapted to correct signals of the effective pixel area by subtracting the first reference signal from each horizontal line signal of the effective pixel area with respect to each corresponding horizontal line” along with a “second correction unit adapted to correct signals of the effective pixel area, which are corrected by said first correction unit, by evenly subtracting a representative value, which is based on the second reference signal, from the signals of the plurality of horizontal lines of the effective pixel area” as recited in amended claim 1. Applicant respectfully submits claim 1 is patentable over the cited references for at least this reason. Dependent claims 2-8 depend either directly or indirectly from claim 1 and, hence, are also in condition for allowance. Independent claim 9 recites first and second correction units with elements analogous to those of claim 1 and, as such, is in condition for allowance for at least similar reasons. Since claim 10 depends from claim 9, it is also deemed to be patentable. Applicant therefore respectfully asserts that the Section 103 rejection of claims 1-4 and 9-10 should be withdrawn.

C. Claims 5-8 are Patentable over AAPA and Shimoyama in view of Tetsuji and further in view of the Cited References

Applicant respectfully traverses the rejection of claims 5-8 under 35 U.S.C. § 103(a) as allegedly being unpatentable for obviousness over AAPA and Shimoyama in view of Tetsuji and further in view of Ookawa, Ide, or Abe. For at least similar reasons as stated above and for the quaternary references failing to overcome the deficiencies of the primary, secondary, and tertiary references, claims 5-8 are also asserted to be patentably distinct. Accordingly, the Section 103

obviousness rejection of claims 5-8 over AAPA and Shimoyama in view of Tetsuji and further in view of Ookawa, Ide, or Abe should be withdrawn. It is respectfully submitted that all of the pending claims are now allowable for the above reasons and early, favorable action in that regard is respectfully requested.

Applicant has chosen in the interest of expediting prosecution of this patent application to distinguish the cited documents from the pending claims as set forth above. These statements should not be regarded in any way as admissions that the cited documents are, in fact, prior art. Likewise, Applicant has chosen not to swear behind the references cited by the Office Action, or to otherwise submit evidence to traverse the rejection at this time. Applicant, however, reserves the right, as provided by 37 C.F.R. §§ 1.131 and 1.132, to do so in the future as appropriate. Furthermore, Applicant has not specifically addressed the rejections of the dependent claims. Applicant respectfully submits that the independent claims from which they depend are in condition for allowance as set forth above. Accordingly, the dependent claims also are in condition for allowance. Applicant, however, reserves the right to address such rejections of the dependent claims in the future as appropriate.

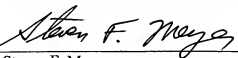
CONCLUSION

For the above-stated reasons, this application is respectfully asserted to be in condition for allowance. An early and favorable examination on the merits is earnestly solicited. In the event that a telephone conference would facilitate the examination of this application in any way, the Examiner is invited to contact the undersigned at the number provided.

THE COMMISSIONER IS HEREBY AUTHORIZED TO CHARGE ANY ADDITIONAL FEES WHICH MAY BE REQUIRED FOR THE TIMELY CONSIDERATION OF THIS AMENDMENT UNDER 37 C.F.R. §§ 1.16 AND 1.17, OR CREDIT ANY OVERPAYMENT TO DEPOSIT ACCOUNT NO. 504827, ORDER NO. 1232-5187.

Respectfully submitted,
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